The Innovation Mechanism in Target Costing

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The Innovation Mechanism in Target Costing

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Abstract

Target costing research studies the series of activities that handle cost management at the development and design stages of new products. The knowledge creation activities of each participant are positioned as essential elements in the target costing activities that create the cost in the new product development and design stages. Based on introspective conduct, the essence of knowledge creation is found in new knowledge creation activities triggered by psychological phenomena such as the blurring of concepts and knowledge fluctuation. The potential for generating new creative knowledge are triggered when given information that cannot be processed with the existing knowledge system. Target cost constitutes such information under some conditions. Information that suppresses knowledge creation exists. With such information, there is little knowledge fluctuation and low potential for generating original knowledge. Whether target cost constitutes information that promotes or suppresses knowledge creation is determined by the extent of participants' knowledge fluctuation in the product planning stage before the target cost is indicated, and the size of the gap between target cost and drifting cost.

Keywords: Target costing, Knowledge creation, Knowledge fluctuation, Information that facilitates knowledge creation, Information that suppresses knowledge creation

JEL classification: **O32, M49**

1. The Issue

As is widely known, target costing research studies the series of activities that handle cost management at the development and design stages of new products. Generally speaking, the research on target costing is advanced in the field of engineering, specifically, in industrial engineering associated with value engineering (VE). The research on target costing as a form of management accounting is lagging behind. However, the publication of noteworthy case studies and questionnaires suggests that there is a rising awareness of the importance of target costing research in the field of management accounting [1].

On the whole, such survey studies shed light on the realities of target costing research, providing reasonable pointers for understanding its characteristics. The results of the field studies also suggest that there is a need to reexamine the conventional theoretical research on target costing, and to

[1] For case studies, see Kondo (1989), Tanaka and Kobayashi (1990). For questionnaire survey results, see Tani et al.(1994), Tanaka (1995), Japan Accounting Association (1996).

construct new theories.

It is time to consider the gap between popular theories and the reality of the process of setting target costs in target costing.

Expected selling price –Target profit margin = Allowable cost
↓
Target cost
↑
Drifting cost

Figure. 1 Setting target cost with the subtraction method

According to popular theory, it is advisable to use the formula in Fig. 1 when setting target cost. Tanaka (1995) refers to this as the subtraction method [2] [3]. The process of using the subtraction method to set target cost is often explained as follows. First, the expected selling price is set based on a market evaluation of the new product design and functions. Then, the company computes the allowable cost by subtracting from the selling price the target profit margin necessary for its survival. The allowable cost is the cost premised on market conditions, which the company must achieve by any means possible to survive in a competitive market. However, participants in the development and design of the new product will feel demoralized if, despite every effort, they are unable to achieve the allowable cost. Therefore, the drifting cost, which is the estimated cost of manufacturing the new product using existing technical standards, is estimated to determine the achievable target cost between the allowable cost and the drifting cost [4].

This commonly accepted theory could be summarized in three points: (1) The subtraction method is an intrinsic component of the process of setting the target cost. (2) The target cost must be set between the allowable cost and the drifting cost. (3) New products must be developed and designed below target cost.

On the other hand, the results of the questionnaire survey by Tanaka M suggest that the realities of setting target cost point in a different direction than popular theory does (Tanaka, 1990). Keeping the focus on the present discussion, the following two points summarize the realities of setting target cost. (1) Roughly half of corporations employ the subtraction method when setting target costs. (2) A considerable number of corporations launch new product manufacturing even when they are unable to achieve the target cost. Needless to say, this reality deviates from the popular theory outlined above.

Now, what does this gap between theory and reality tell researchers of management accounting? The discrepancy suggests that there is at least a need to reexamine popular theory and to use such reexamination as the springboard for constructing new theories, that is to say, theories that are able to logically and systematically explain the reality of the process of setting target cost.

In this article, I will explore the construction of a new theory based on the concerns outlined above while focusing on the role of target cost information in the development and design of new products.

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[2] Previously, Tanaka termed the subtraction method the allocation method. In addition to the subtraction method, there is also the addition method. For details, see Tanaka (1995).

[3] Popular theory refers to explanations common to many researchers, but, in particular, I have considered the market-oriented management system and associated formula for setting target cost in Kondo (1990).

[4] Drifting cost refers to the achievable standard cost using current technical standards.

2. The Characteristics of Knowledge Creation or Innovation Creation[5]

Target costing, which is the subject of the present study, is an activity where the capacity for knowledge creation or innovation creation among those who participate in the process is an essential element. The outcome of the target costing process depends largely on the creativity of the participants where new product planning, development, and design are concerned. Numerous case studies tell us that corporate success is greatly supported by the successful planning, development, and design of innovative new products never before experienced by consumers. In this sense, it is hardly an exaggeration to say that the creativity of the participants is an intrinsic element of target costing.

So far there has not been adequate recognition of its importance in the area of management accounting. Past research has made issues around decision-making the center of attention, focusing the discussion on optimization problems within such a framework, while taking alternative proposals as a given. As a result, the processes behind the creation of alternative proposals have been pushed aside. The fact that management accounting research has been chiefly restricted to human decision-making activities, pushing the creation of alternative proposals, i.e., an essential element of knowledge creation, outside its range, may have caused the gap between theory and reality.

As many analysts have pointed out, if human knowledge creation plays a decisive role in target costing at the stage of new product development and design, the issue should undoubtedly be at the heart of management accounting research. In this regard, the modeling of human knowledge creation becomes the starting point for the correct reconfiguration of management accounting research. Having pointed out the need for modeling, the discussion will now shift to an examination of the characteristics of knowledge creation based on Imada(1985) and Nonaka(1990) [6].

Imada identifies three types of human conduct: habitual conduct, rational conduct, and introspective conduct (Imada, 1985, pp. 264-277). Habitual conduct is acquired naturally by imitating the conduct of the people around us. Such conduct includes, for example, brushing one's teeth in the morning, or having three meals a day. Rational conduct is a series of acts involving choices that result in optimization, decision-making being a typical example. Lastly, introspective conduct involves the discovery of new thought patterns and conduct when something triggers a reconsideration of one's own past thought patterns and conduct. Imada lists undesirable outcomes, social problems, and changing values as some of the opportunities for such introspective conduct. When following Imada's classification of the patterns of human conduct into the three categories of habitual conduct, rational conduct, and introspective conduct, while attaching meaning to each one as I have done above, it is clear that introspective conduct is linked to knowledge creation.

Next, let us consider Nonaka's theory of knowledge creation. Nonaka presents ten propositions that make up the organizational knowledge creation model (Nonaka,1990, pp 68-91). Two of the propositions concern knowledge creation at the individual level, which is associated with the issue discussed here. The first proposition is that individual knowledge creation within an organization is the source of organizational knowledge creation, and that such individual knowledge creation is facilitated by the autonomy and intentions of the members of the organization. The second proposition is that the emergence of fluctuation or chaos induces members to learn retroactively, and generates potential for information and knowledge creation. According to Nonaka(1990), such fluctuation or chaos emerges out of a sense of danger or strategic ambiguity on the part of the organization, or highly challenging goals.

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[5] In this paper, innovation creation and knowledge creation are treated as synonyms.

[6] This article does not go as far as building a model of knowledge creation, but confirms the characteristics of knowledge creation in the theories of Imada (1985) and Nonaka (1990).

We have clarified two points based on the theories of Imada(1985) and Nonaka(1990): (1) the significance of knowledge creation, and (2) the triggers for such creative activities. Regarding the first point, knowledge creation is based on introspective conduct and knowledge fluctuation is its essence. Nonaka's concept of fluctuation is of particularly great interest here. We observe that new knowledge and creative knowledge is generated when there are great knowledge fluctuations. Regarding the second point, information that cannot be processed under the existing knowledge systems causes knowledge to fluctuate and becomes an opportunity to trigger creativity.

Incidentally, contrary to the earlier explanation, there are also cases when information suppresses knowledge creation. One of the rules of brainstorming, which is a knowledge creation methodology, is "No criticism" (Morioka, 1985, p. 102). The reason for this rule is that criticism excludes ideas and suppresses knowledge fluctuation. In short, criticism makes it impossible to deviate from the existing knowledge system and new knowledge no longer emerges. To sum up, information that prevents deviation from existing knowledge systems reduces knowledge fluctuation and suppresses knowledge creation.

So far, I have confirmed the characteristics of knowledge creation, the information that provides opportunities for knowledge creation, and the characteristics of suppressive information. It is now time to change the topic to an examination of the role of target cost in target costing activities. In the discussion in section 3 below, the discussion is shaped by the explanation of the influence of proposed target cost on the knowledge creation activities of the participants in target costing activities.

3. Target Cost as Information that Facilitates Knowledge Creation

Cost reduction, i.e., the method of managing cost at the development and design stages of new products, is an important element in target costing activities. VE (value engineering = value analysis) is a specific method for managing cost, i.e., cost reduction. As a result, when examining the present issue it is appropriate to add an analytical perspective to the role of target cost information in VE knowledge creation.

Briefly, VE is a course of action to increase utility value for consumers by remodeling products. According to Tanaka M(1985), the extent of the utility value expresses, in principle, the correlation between product functionality and cost. He refers to this as the value ratio, which he arranges into the four patterns presented in Fig. 2 (Tanaka M, 1985, pp 7-9). The four value ratio patterns are, in order from the left, (1) the cost-down method, and (2) the method of improving functionality. Pattern (3) attempts to increase utility value by improving functionality above the cost increase. Finally, pattern (4) is a method for improving both cost-down and functionality.

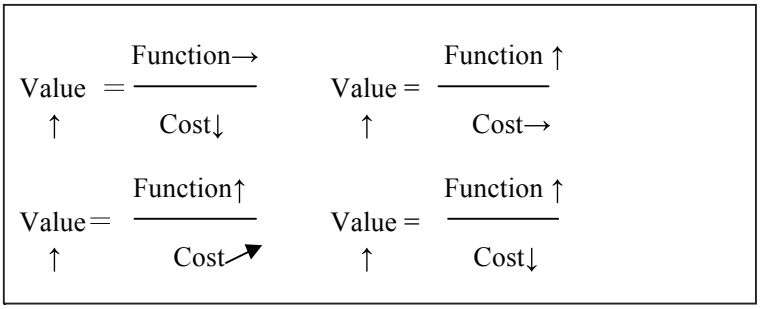

Figure 2. Four patterns for improving the VE value ratio

Seeing that the aim of the VE process is to improve the utility value of the finished product, and, having confirmed that such efforts can be classified into four patterns, I would like to shift the discussion to a concrete analysis of the VE job plan. As Table 1 indicates, 2nd Look VE consists of five steps: (1) Selecting the target, (2) Defining functionality, (3) Evaluating functionality, (4) Preparing kaizen proposals, and (5) Proposal and follow-up (Tanaka M, 1985, pp. 35-45)[7].

Table 1. 2nd Look VE Job Plan (Tanaka M, 1985, p37)

	Summary	Questions	Specifics
Step 1	Select target	What to analyze for value	(1) Select object
Step 2	Define functions	What is it? How does it work?	(2) Gather information (3) Define functions (4) Categorize functions
Step 3	Evaluate functions	What is the cost of each function? What is the value of the function?	(5) Calculate cost for each function (6) Evaluate function
Step 4	Create kaizen proposal	Are there other proposals that would work in the same way? What about kaizen proposals? Is the proposal certain to increase value?	(7) Ideas for kaizen proposals (8) Summary evaluation and realization (9) Detailed evaluation
Step 5	Proposal and follow-up	Is it possible to put the proposal into practice? What about the implementation status?	(10) Write up proposal (11) Understand implementation status

How does target cost information influence the knowledge creation activities of the VE participants in the process of executing this job plan? Fig. 3 uses the concept of the signifier and the signified to represent how the object, i.e., the product, appears to the eyes of the VE participants [8]. The figure assumes a case of increasing the utility value of Product A by means of cost-down as indicated in pattern (1) above. That is to say, the role of VE target cost information is clarified when other VE factors are stabilized. First of all, in Step 1, with Product A in front of them, the participants clearly recall the signifier and the signified for Product A. Of course, each participant has a different image of the substance of Product A. At this stage, there is absolutely no fluctuation in the knowledge of each individual. In Step 2, the participants define the functions of Product A, i.e., the substance of product A is analyzed from the perspective of its functions. Here, the assumption is that two functions are analyzed. In Step 3, these functions are evaluated and the cost of each function is calculated. The target cost for specific cost-down is set at this stage.

There is an important point to be made about the role of target cost information at the stage of setting the target cost. Namely, the signified Product A becomes blurred in the eyes of the VE participants when the target cost is set. The term “blurred” is used for Fig. 3, but, to borrow from Nonaka(1990), we can also say that knowledge enters a state of fluctuation. The fact that the signified was blurred or that knowledge was fluctuating simply shows a good trigger, the target cost, was

[7] Here, 2nd Look VE refers to VE in the late stages of target costing when the finished product exists.

[8] The concepts of the signifier and the signified are used in linguistics. These concepts must not be understood as tangible in themselves, but this article treats them as tangible concepts for the sake of convenience. For details, please refer to Maruyama (1983, 1984).

provided. To achieve the target cost, it is no longer permissible to leave Product A untouched. It must be remodeled in some way—by changing the materials, or the manufacturing process. When VE participants think like this, the signified is blurred, and knowledge fluctuates for each individual. Of course, such "blurring of the signified" and "knowledge fluctuation" stimulate each participant's ability to create knowledge, which is linked to the formulation of kaizen proposals, i.e., alternative proposals, in Step 4 [9]. This is the creative activity when individuals use their ingenuity to create new knowledge. Finally, Step 5 is a decision-making process whereby the proposal with the highest value ratio and most potential for practical implementation is selected from several alternatives.

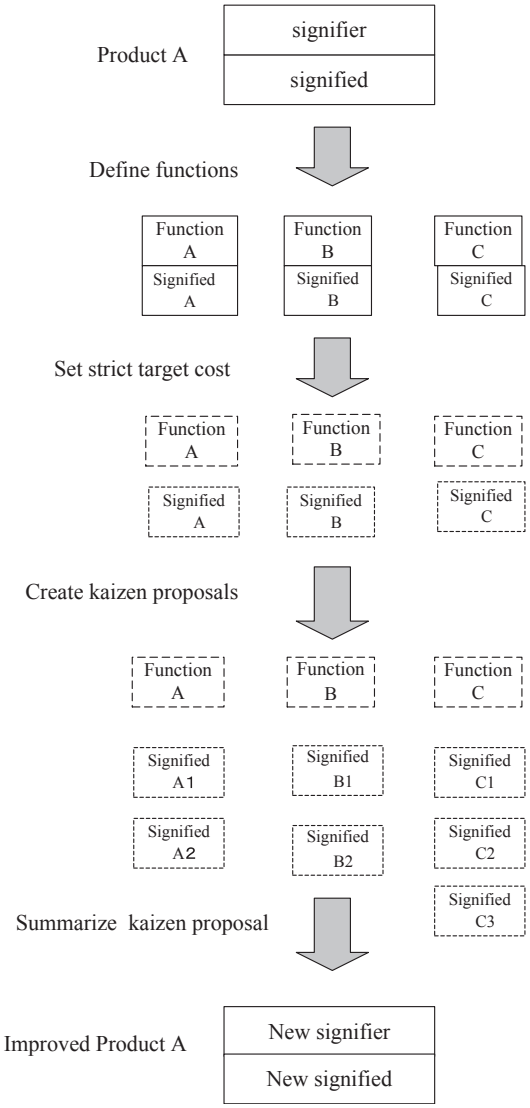

Figure 3. Knowledge fluctuation expands due to strict target cost

[9] Alternative proposals in VE are not necessarily completely new ideas; rather, they often consist of technical information external to the company.

The analysis above has made it clear that in the case of VE activities where cost-down is the only method of increasing the value ratio of products, setting target costs motivates VE participants to create knowledge. Indicating the target cost in a situation where the participants' knowledge does not fluctuate triggers a psychological phenomenon referred to as the blurring of the signified, or the fluctuation of knowledge in the minds of each person, which stimulates the creative ability of each individual and leads to some manifestation. This is because, under the conditions assumed earlier, target cost information becomes information that cannot be processed under the existing knowledge system.

4. Target Cost as Information that Suppresses Knowledge Creation

Contrary to the explanation in the previous section, the cases where target cost information suppresses the ability of VE participants to create knowledge cannot be ignored. I will therefore proceed to the 1st Look VE Job Plan in Table 2 to confirm the negative influences of such target cost (Tsuchiya, 1985, p. 142)[10].

Table 2. 1st Look VE Job Plan

Input	Requirements of consumers, product planning departments etc.
Analyze functions	What is it? What does it do? What about the value? • Clearly understand user requirements, and the requirements of corporations, planners, and developers • Clearly define what functions must be served, clarify the interaction between individual functions, and confirm required functions • Evaluate target cost for each function to find out what it will cost to achieve the function
Create	Does anything else perform the function? Based on the function to fulfill, bring together the expertise and generate lots of ideas from every angle Combine the ideas, configure the ideas, and put together several concrete proposals
Evaluate and decide	What is the cost? Are we sure that it performs the required function? Evaluate the concrete proposals from the aspects of technology and economy (cost), select the best low-cost proposal that fulfills the required functions, and make a decision. If necessary, carry out testing
Output	Produce specifications and blueprints based on the selected proposal

In Step 1, the product planning stage, the requirements of consumers and product planning departments concerning the new product design, function, and price are collected as input information for new product development. In Step 2, the functions are analyzed and a target cost is set for each function. Step 3 creates development proposals for components and products that fulfill the functions identified in the analytical step and meet the target cost. In other words, alternative proposals. In Step 4, the alternative proposals are evaluated and decisions are made. In the final step, the design is made based on the proposal selected.

[10] Here, 1st Look VE refers to VE in the development design stage, that is, VE in the early stages of target costing.

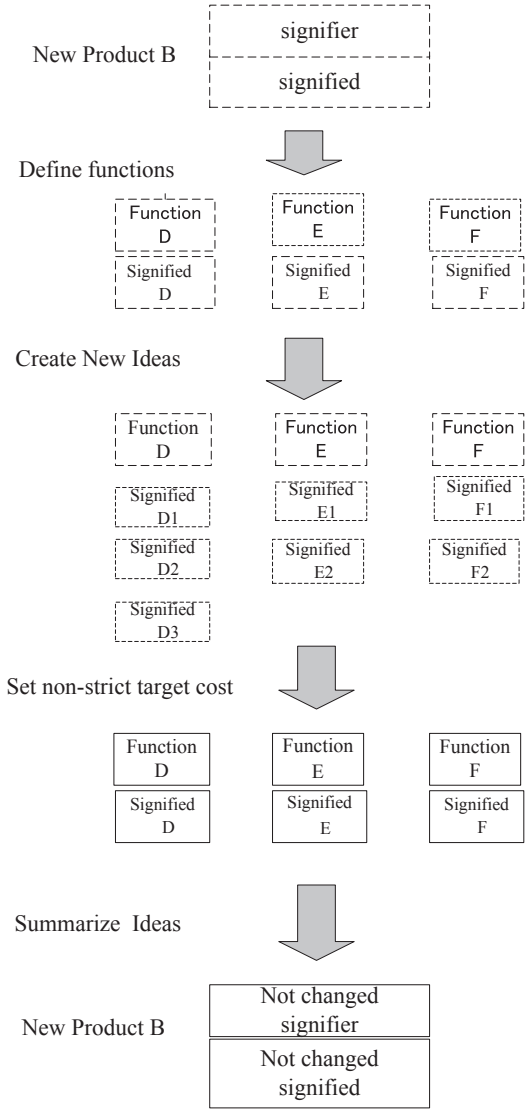

Figure 4. Knowledge fluctuation is suppressed due to non-strict target cost

Fig. 4 represents how the new product appears in the eyes of the VE participants. Here, the input information for new product development is brimming with novelty, and it is assumed that the target cost is set a little more strictly than the drifting cost. The lines are blurred in Step 1 because the VE participants are unable to form a clear mental image of the signifier and signified for Product B. In other words, knowledge fluctuation is extremely high. With function analysis in Step 2, the image becomes a little clearer. The target cost is set at this stage, further clarifying the image and bringing the blurred areas into focus. In short, knowledge fluctuation is reduced. When alternative proposals are created in Step 3, the image of the new product is almost complete. In Step 4, the most suitable proposal among those created is selected. The image is now even clearer. The last step is to draw the design. There is hardly any knowledge fluctuation at this stage.

What matters here is that knowledge fluctuation is suppressed at one sweep when the target cost

is set in Step 2. New information concerning design and functionality forms in the minds of the participants in the product development stage. In short, when knowledge fluctuates greatly, manifesting as knowledge creation, there is potential to generate creative knowledge. Incidentally, the participants will have a mental image of the new product based on past knowledge of product development where products were created below target cost because they have been provided with somewhat strict information about target cost. As a result, there is little knowledge fluctuation and the creativity of the product development stage is lost.

Based on the reasoning outlined above, target cost information curbs knowledge fluctuation and suppresses knowledge creation in cases where there is a lot of fluctuation in participants' knowledge at the product planning stage. As indicated in Section 2, under the conditions assumed here, the target cost information prevents deviation from the existing knowledge system.

5. Conclusions

The standpoint of this article is that there is a gap between popular theory on target costing and actual practices in Japan. Such a gap between theory and reality suggests that there is a need to reexamine popular theories on target costing and to replace them with a new theory. In this article, I explore the construction of a new theory while keeping the focus of the discussion on the role of target cost information. The article concludes with a summary of the importance of developing such a theory.

(1) The knowledge creation activities of each participant are positioned as essential elements in the target costing activities that create the cost in the new product development and design stages.

(2) Based on introspective conduct, the essence of knowledge creation is found in new knowledge creation activities triggered by psychological phenomena such as the blurring of concepts and knowledge fluctuation. The potential for generating new creative knowledge is greater when there is more knowledge fluctuation. Such psychological phenomena are triggered when given information that cannot be processed with the existing knowledge system. Target cost constitutes such information under the conditions assumed in Section 2.

(3) Information that suppresses knowledge creation exists. With such information, there is little knowledge fluctuation and low potential for generating original knowledge. Such information prevents deviation from the existing knowledge system. Target cost constitutes such information under the conditions assumed in section 4.

(4) Whether target cost constitutes information that promotes or suppresses knowledge creation is determined by the extent of participants' knowledge fluctuation in the product planning stage before the target cost is indicated, and the size of the gap between target cost and drifting cost. The relationship is outlined in Table 3 [11] [12] [13].

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[11] In Table 3 (and throughout the article), the target cost requirement is assumed to have higher priority than other conditions such as the design, color, or functionality of the new product.

[12] According to the presentation of target cost in Table 3, target cost becomes information that promotes knowledge creation if there is more knowledge fluctuation in the product planning stage. If there is little knowledge fluctuation, target cost becomes information that suppresses knowledge creation.

[13] This article does not allow for a detailed discussion, but all knowledge fluctuation does not necessarily generate new creative knowledge. The bottom line is that for a product to be completed, new knowledge must be integrated with the existing knowledge system. The greater the knowledge fluctuation, the more potential for generating new creative knowledge, but the potential for bringing products to completion decreases. Conversely, one might surmise that hardly any new creative knowledge is generated when knowledge fluctuation is small, but the potential for bringing products to completion increases.

Table 3. Relationship between target cost and extent of knowledge fluctuation

		Extent of knowledge fluctuation	
		Large	Small
Gap between target cost and drifting cost	Large	Large fluctuations (section 3)	Large fluctuations (section 3)
	Small	Small fluctuations (section 4)	Small fluctuations (section 4)

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